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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,169	10/23/2003	Mark S. Wallace	020621	2628

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QUALCOMM INCORPORATED
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EXAMINER	
HALIYUR, VENKATESH N	

ART UNIT	PAPER NUMBER
2616	

NOTIFICATION DATE	DELIVERY MODE
06/19/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/693,169	WALLACE ET AL.	
	Examiner	Art Unit	
	Venkatesh Haliyur	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/23/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28,34* is/are rejected.

7)☐ Claim(s) *29-33 and 35-39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-39 are pending in the application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Boros et al [US Pat: 6,654,590].

Regarding claims 1,18,24, Boros et al in the invention of "Determining a Calibration Function Using at Least One Remote Terminal" disclosed a method for calibrating downlink and uplink channels in a wireless communication system **(Figs 4-7)**, comprising: obtaining an estimate of a downlink channel response **(col 20, lines 55-58)**; obtaining an estimate of an uplink channel response **(col 20, lines 49-54)**; determining first **(uplink weight vectors)** and second **(downlink weight vectors)** sets of correction factors **(weighted vectors)** based on the estimates of the downlink and

uplink channel responses **(col 14, lines 30-60);** and calibrating the downlink channel and uplink channel based on the first and second sets of correction factors, respectively, to form a calibrated downlink channel and a calibrated uplink channel **(col 19, lines 46-67).**

Regarding claims 2, 22-23, Boros et al disclosed that the first set of correction factors **(uplink weight vectors)** is used to scale symbols prior **(pre-processing)** to transmission on the downlink channel **(col 19, lines 7-15)** and the second set of correction factors is used to scale symbols prior to transmission on the uplink channel **(col 17, lines 24-42)**.

Regarding claim 3, Boros et al disclosed that the first set of correction factors **(uplink weight vectors)** is used to scale symbols received on the downlink channel **(col 19, lines 1-6)** and the second set of correction factors **(downlink weight vectors)** is used to scale symbols received on the uplink channel **(col 17, lines 43-50)**

Regarding claim 4, Boros et al disclosed that the first and second sets of correction are determined based on the following equation: H_{dn} is a matrix for the estimate of the downlink channel response, H_{up} is a matrix for the estimate of the uplink channel response, K_{ap} is a matrix for the first set of correction factors, K_{ut} is a matrix for the second set of correction factors, and T denotes a transpose **(col 19, lines 13-33).**

Regarding claims 5-7,20-21,27, Boros et al disclosed determining the first and second sets of correction factors includes: computing a matrix C as an element-wise ratio of the matrix H_{up} over matrix H_{dn}, and deriving the matrices K_{ap} and K_{ut} based on the matrix C and the deriving the matrix K_{ut} includes normalizing each of a plurality of

rows of the matrix C **(col 24, lines 46-67)** and determining a mean of the plurality of normalized rows of the matrix C, and wherein the matrix K_{ut} is formed based on the mean of the plurality of normalized rows and deriving the matrix K_{ap} includes normalizing each of a plurality of columns of the matrix C, and determining a mean of inverses of the plurality of normalized columns of the matrix C **(col 25, lines 1-67)** and wherein the matrix K_{ap} is formed based on the mean of the inverses of the plurality of normalized columns **(col 29, lines 24-64)**.

Regarding claims 8-9,19,26, Boros et al disclosed wherein the matrices and based on a minimum mean square error (MMSE) computation and wherein the MMSE computation minimizes a mean square error (MSE) given as **equation (col 14, lines 64-67, col 15, lines 1-30).**

Regarding claims 10-12, Boros et al disclosed determining a scaling value indicative of an average difference between the estimate of the downlink channel response and the estimate of the uplink channel response **(col 14, lines 49-60)** and wherein the estimates for the downlink and uplink channel responses are normalized to account for receiver noise floor **(SINR)** and wherein the determining is performed at a user terminal **(col 25, lines 14-46).**

Regarding claim 13, Boros et al disclosed wherein a first set of matrices of correction factors for the downlink channel is determined for a first set of subbands **(uplink subarray)** and interpolating the first set of matrices to obtain a second set of matrices of correction factors for the downlink channel for a second set of subbands **(downlink subarray, col 21, lines 9-35, col 29, lines 5-22)**.

Regarding claim 14, Boros et al disclosed that the estimates of the downlink and uplink channel responses are each obtained based on a pilot transmitted from a plurality of antennas and orthogonalized with a plurality of orthogonal sequences **(col 25, lines 49-67).**

Regarding claim 15, Boros et al disclosed that the estimate of the uplink channel response is obtained based on a pilot transmitted **(paging)** on the uplink channel and wherein the estimate of the downlink channel response is obtained based on a pilot transmitted on the downlink channel **(col 20, lines 40-58).**

Regarding claims 16-17, Boros et al disclosed that the TDD system is a multiple-input multiple-output **(multiple transmit/receive antenna arrays)** system and wherein the TDD system utilizes orthogonal frequency division multiplexing **(col 12, lines 47-67).**

Regarding claim 25, Boros et al disclosed a user terminal in a wireless time division duplexed (TDD) communication system **(Figs 1-5),** comprising: an TX spatial processor **(item 135 of Fig 1, col 12, lines 42-67)** operative to transmit a first pilot **(paging)** on an uplink channel; an RX spatial processor **(item 111 of Fig 1, col 13, lines 1-14)** operative to receive a second pilot on a downlink channel and derive an estimate of a downlink channel response based on the received second pilot, and to receive an estimate of an uplink channel response derived based on the transmitted first pilot **(col 19, lines 52-67)**; and a controller operative to determine first and second sets of correction factors based on the estimates of the downlink and uplink channel responses **(col 20, lines 49-58)**, wherein a calibrated downlink channel is formed by

using the first set of correction factors **(uplink weight vectors)** for the downlink channel and a calibrated uplink channel is formed by using the second set of correction factors **(uplink weight vectors)** for the uplink channel **(col 19, lines 1-37).**

4. Claims 28,34 are rejected under 35 U.S.C. 102(e) as being anticipated by Catreux et al. [US Pat: 6,802,035].

Regarding claims 28,34, Catreux et al in the invention of "System and Method of Dynamically Optimizing a Transmission Mode of Wirelessly Transmitted Information" disclosed a method for communication in a wireless system **(Figs 1-3, col 4, lines 10-44)**, comprising: calibrating **(channel characterization)** one or more communication links of between a plurality of user stations **(subscribers, Fig 1)** and one or more access points **(base station, item 110 of Fig 1)**, based on one or more sets of correction factors **(error factors)** derived from estimates of channel responses associated with the one or more communication links **(col 2, lines 15-32)**, the plurality of user stations including a first user station **(item 120 of Fig 1)** and a second user station **(item 120 of Fig 1)**; and establishing communication between the first and second user stations using steering **(adjusting the quality parameters)** without performing calibration between the first and second user stations **(col 3, lines 18-48)**.

Regarding claim 29, Catreux et al disclosed establishing the communication between the first and second user stations comprises: sending, from the first user station, a pilot and a request to establish a communication link with the second user

station; sending, from the second user station, a steered pilot and an acknowledgment in response to receiving the pilot and the request from first user station; transmitting information between the first and second user stations using steering based on the steered pilot.

Allowable Subject Matter

5. Claims 29-33,35-39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. Any inquiry concerning this communication or earlier communications should be directed to the attention to Venkatesh Haliyur whose phone number is 571-272-8616. The examiner can normally be reached on Monday-Friday from 9:00AM to 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing Chan can be reached @ (571)-272-7493. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (571)-272-2600 or fax to 571-273-8300.

7. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197(toll-free).

Venkatesh Haliyur

Patent Examiner

06/12/07

Wing Fu Chan
6/13/07

WING CHAN
SUPERVISORY PATENT EXAMINER